Screening of Factor Influencing Wax Deposition Using Full Factorial Experimental Design

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ABSTRACT
The purpose of this work was to study the rate of wax deposition of Malaysian crude oil using full factorial design. Important parameters affecting wax deposition such as experimental duration, speed of rotation, cold finger temperature, and inhibitor concentration were investigated. The individual effects of variables and its interaction effects towards the dependent variables were studied. Wax deposit is the dependent variable. The results of the study showed that less wax deposit was obtained (0.75 g) with optimal conditions of initial poly(ethylene-co-vinyl acetate) concentration of 5000 ppm, 2 h duration without rotation speed, and 15°C cold finger temperature. These results demonstrate that cold finger temperature and experimental duration could be the main factors affecting wax deposit formation. The minimum amount of wax deposit obtained could reduce the chances of blocked pipelines; however, crude oil production increased. Nevertheless, Design Expert can be a valuable tool to quantify and detect the special relationships of two of more factors known as interactions regarding how they factors could affect a process, especially for screening purpose.

KEYWORDS: Cold finger, wax deposition, screening design, full factorial design, design expert

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